

CLAIMS

1. An image data processing apparatus comprising:
 - an image data storing unit that stores image data;
 - a spatial filter processing unit that applies spatial filter
 - 5 processing, in which a dynamic range for output is set wider than a dynamic range for input, to the image data stored in the image data storing unit;
 - a resolution increase processing unit that applies resolution conversion processing for converting a present resolution into a
 - 10 resolution higher than the present resolution to the image data after the spatial filter processing by the spatial filter processing unit;
 - a gamma correction unit that applies gamma correction processing to the image data after the resolution conversion processing by the resolution increase processing unit; and
 - 15 a transmitting unit that sends the image data after the gamma correction processing by the gamma correction unit to an external apparatus.
2. An image data processing apparatus comprising:
 - 20 a image data storing unit that stores image data;
 - a resolution increase processing unit that applies resolution conversion processing for converting a present resolution into a resolution higher than the present resolution to the image data stored in the image data storing unit;
 - 25 a spatial filter processing unit that applies spatial filter

processing to the image data after the resolution conversion processing by the resolution increase processing unit;

5 a gamma correction unit that applies gamma correction processing to the image data after the spatial filter processing by the spatial filter processing unit;

a resolution reduction processing unit that applies resolution conversion processing for converting a present resolution into a resolution lower than the present resolution to the image data after the gamma correction processing by the gamma correction unit; and

10 a transmitting unit that sends the image data after the resolution conversion processing by the resolution reduction processing unit to an external apparatus.

3. The image data processing apparatus according to claim 1,
15 further comprising a resolution reduction processing unit that applies resolution conversion processing for converting a present pixel density into a pixel density lower than the present pixel density to the image data after the processing by the gamma correction unit.

20 4. The image data processing apparatus according to claim 2 or 3, wherein

the resolution reduction processing unit converts a resolution of the image data into a resolution before the resolution conversion processing by the resolution increase processing unit.

5. The image data processing apparatus according to claim 1 or 2, further comprising a format converting unit that converts the image data to be sent by the transmitting unit into a general-purpose format that can be inspected in the external apparatus.

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6. The image data processing apparatus according to claim 1 or 2, wherein

the resolution increase processing unit performs the resolution conversion processing only for a main scanning direction.

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7. The image data processing apparatus according to claim 1 or 2, wherein

the resolution increase processing unit performs resolution conversion processing for converting a resolution into a resolution

15 obtained by multiplying a present invention by an integer equal to or larger than two.

8. The image data processing apparatus according to claim 1 or 2, wherein

20 the resolution increase processing unit performs resolution conversion processing for converting image data with a resolution of 600 dpi into image data with a resolution of 1200 dpi.

9. An image data processing method comprising:

25 applying spatial filter processing, in which a dynamic range for

output is set wider than a dynamic range for input, to image data to be inputted;

5 applying resolution conversion processing for converting a density into a high density to the image data after the spatial filter processing;

 applying gamma correction processing to the image data after the resolution conversion processing; and

 sending the image data after the gamma correction processing to an external apparatus.

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10. An image data processing method comprising:

 applying resolution conversion processing for converting a resolution into a high resolution to image data to be inputted;

15 applying spatial filter processing to the image data after the resolution conversion processing;

 applying gamma correction processing to the image data after the spatial filter processing;

20 applying resolution conversion processing for converting a present resolution into a resolution lower than the present resolution to the image data after the gamma correction processing; and

 sending the image data after the resolution conversion processing to an external apparatus.

25 11. The image data processing method according to claim 9, further comprising applying resolution conversion processing for converting a

present resolution into a resolution lower than the present resolution to the image data after performing the gamma correction processing.

12. The image data processing method according to claim 10 or 11,
5 further comprising converting a resolution of the image data into a resolution before performing the resolution conversion processing for converting a resolution into a high resolution by the resolution conversion processing for converting a resolution into a low resolution.

10 13. The image data processing method according to claim 9 or 10, further comprising converting the image data to be sent at the sending into a general-purpose format that can be inspected in the external apparatus.

15 14. The image data processing method according to claim 9 or 10, wherein

the resolution conversion processing includes performing the resolution conversion processing only for a main scanning direction.

20 15. The image data processing method according to claim 9 or 10, wherein

the resolution conversion processing includes performing the resolution conversion processing for converting a resolution into a resolution obtained by multiplying a present invention by an integer
25 equal to or larger than two.

16. The image data processing method according to claim 9 or 10, wherein

the resolution conversion processing includes performing the
5 resolution conversion processing for converting image data with a resolution of 600 dpi into image data with a resolution of 1200 dpi.

17. A computer program that includes instructions which when executed on a computer cause the computer to execute:

10 applying spatial filter processing, in which a dynamic range for output is set wider than a dynamic range for input, to image data to be inputted;

applying resolution conversion processing for converting a density into a high density to the image data after the spatial filter
15 processing;

applying gamma correction processing to the image data after the resolution conversion processing; and

sending the image data after the gamma correction processing to an external apparatus.

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18. A computer program that includes instructions which when executed on a computer cause the computer to execute:

applying resolution conversion processing for converting a resolution into a high resolution to image data to be inputted;

25 applying spatial filter processing to the image data after the

resolution conversion processing;

applying gamma correction processing to the image data after the spatial filter processing;

applying resolution conversion processing for converting a present resolution into a resolution lower than the present resolution to the image data after the gamma correction processing; and

sending the image data after the resolution conversion processing to an external apparatus.

19. The computer program according to claim 17, further comprising applying resolution conversion processing for converting a present resolution into a resolution lower than the present resolution to the image data after the gamma correction processing.

20. The computer program according to claim 18 or 19, further comprising converting a resolution of the image data into a resolution before performing the resolution conversion processing for converting a resolution into a high resolution by the resolution conversion processing for converting a resolution into a low resolution.

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21. The computer program according to claim 17 or 18, further comprising converting the image data to be sent at the sending into a general-purpose format that can be inspected in the external apparatus.

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22. The computer program according to claim 17 or 18, wherein the resolution conversion processing includes performing the resolution conversion processing only for a main scanning direction.

5 23. The computer program according to claim 17 or 18, wherein the resolution conversion processing includes performing the resolution conversion processing for converting a resolution into a resolution obtained by multiplying a present invention by an integer equal to or larger than two.

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24. The computer program according to claim 17 or 18, wherein the resolution conversion processing includes performing the resolution conversion processing for converting image data with a resolution of 600 dpi into image data with a resolution of 1200 dpi.

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25. A computer readable recording medium having recorded therein the program according to claim 17 or 18:

26. An image reading apparatus connectable to an electric
20 communication line, comprising:
a spatial filter processing unit that performs spatial filter processing so as to expand a predetermined dynamic range read by the image reading apparatus and a dynamic range of an original data of a resolution;

25 a first resolution converting unit that converts the resolution of

the original data for which the dynamic range is expanded into a density higher than a present pixel density, and converts the dynamic range of the original data of the resolution, for which the dynamic range is expanded and which is converted into a high density, to be brought
5 back to the predetermined dynamic range;

a second resolution converting unit that converts the resolution of the original data of the high density resolution, for which the dynamic range is converted, to be brought back to the predetermined resolution;
and

10 a transmitting unit that sends the original data of the resolution brought back to the predetermined resolution.

27. The image reading apparatus according to claim 26, wherein the spatial filter processing unit calculates a maximum tone of
15 the original data after the spatial filter processing based on a spatial filter factor set in advance and expands the dynamic range of the original data to be equal to or more than the value.

28. The image reading apparatus according to claim 26, wherein
20 the transmitting unit compresses the original data and sends the original data.

29. The image reading apparatus according to claim 28, wherein the transmitting unit compresses the original data with
25 reversible coding and sends the original data.

30. The image reading apparatus according to claim 26, further comprising a tone processing unit that applies processing concerning a halftone to the original data.

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31. The image reading apparatus according to claim 30, wherein the tone processing unit performs processing for converting the original data of the resolution, for which the dynamic range is expanded and which is converted into a high density, into a halftone of two tones.

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32. The image reading apparatus according to claim 31, wherein the tone processing unit performs processing for dividing the original data of the resolution, for which the dynamic range is expanded and which is converted into a high density, to a maximum value and a minimum value of the dynamic range according to a predetermined threshold value and processing for converting the divided original data into a halftone of two tones.

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33. The image reading apparatus according to claim 26, further comprising a gamma correction processing unit that applies gamma correction processing to the original data.

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